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ABSTRACT

The verified successful business practices described in this booklet were being used by Massachusetts schools in the late 1970s. The practices have resulted in cost savings, are generally easy to replicate, and usually do not require major capital outlay. The practices listed are largely conservation practices or relate to food service management, but cooperative transportation and purchasing practices are also discussed. For each money-saving measure the book gives a brief description, estimated efficiency or cost savings, and a contact person. The book refers the reader to more complete case studies that further describe many of the practices. (Author/JM)

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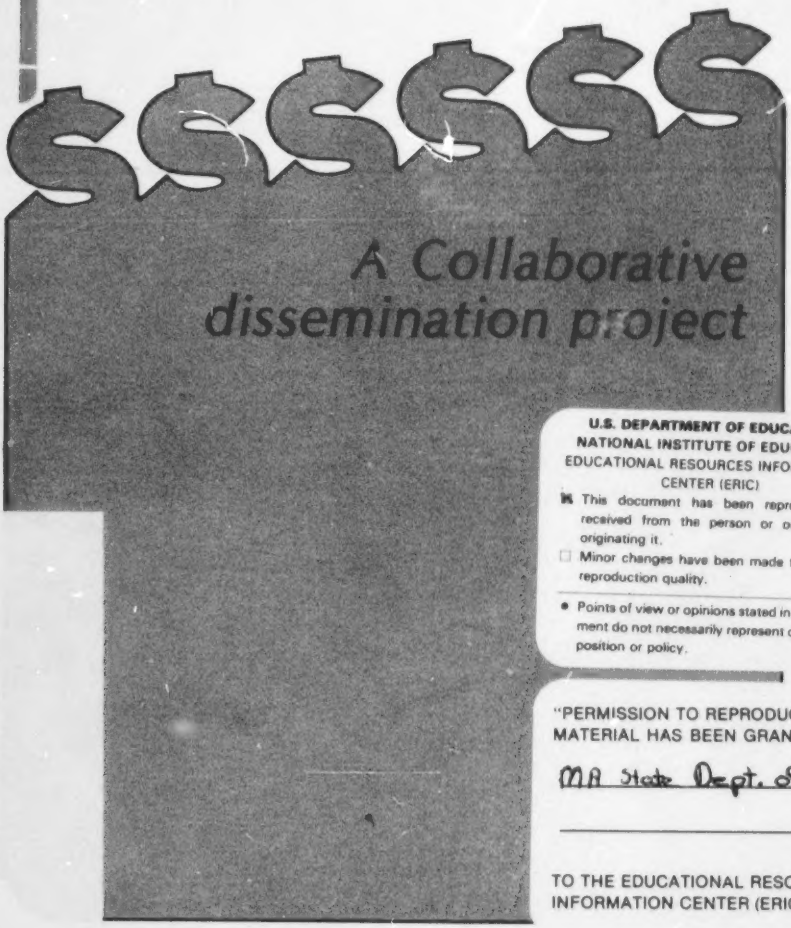
COST-EFFECTIVE BUSINESS PRACTICES

of Schools in Massachusetts



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Foreword

The Massachusetts Board of Education has adopted the general priority to assist local school districts to improve efficiency and cost-effectiveness in school district operations. In line with this priority, the Massachusetts Department of Education has initiated efforts to disseminate promising business practices for consideration by school systems across the state.

This publication contains descriptions of a number of successful business practices in Massachusetts. Practices are verified for dissemination through the joint efforts of the School Superintendents' Association, School Business Officials' Association, and the School Food Services Association. School officials are encouraged to consider adoption of these practices. The described practices have resulted in cost savings in school districts across the state. In a number of instances these practices can be replicated and do not require major capital outlay.

In addition to these brief descriptions, case studies on many of the practices have been prepared and are available from the Merrimack Education Center, 101 Mill Road, Chelmsford, MA 01824. All district reports are entered into the school practices information file (MG file) and may be located by the file number (MG-000) listed on each abstract. Inquiries can also be directed to school officials identified as contact people in the abstracts.

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Title — Energy Conservation Practice
Agawam Public Schools

Description

A long range plan to reduce energy costs was begun in the school year 1971-72. Within this plan was the education of all system personnel to energy cost escalation and a concomitant program of capital investment—including boiler modernization, the rebuilding of condensate traps, and the repair/replacement of thermostats. Energy usage per square foot was measured for each of nine schools. Semi-annual reports issued to administrators and custodians fostered a spirit of competition toward conservation. Technical assistance was provided to custodians by an in-house electrician. The program, then, was two-fold—school personnel awareness as well as pragmatic operational support.

Efficiency (assurances/claims or cost savings)

Over a three year period $100,000 was expended for capital investment measures with an estimated annual savings of $35,000 to $40,000. Energy costs for FY '79 were maintained at the FY '74 level. Oil consumption was down from 480,000 gallons (FY '74) to 234,000 gallons (FY '79) and kilowatt-hours were cut from 3,129,000 to 1,840,000 for the same period.

Availability

A case study is on file MG-601.

Contact Person

James H. Coon, Jr.
Director of Business Services
1305 Springfield Street
Feeding Hills, MA 01030
(413) 789-1400, Ext. 436

MG-601

Title — Energy Conservation Practice
Arlington Public Schools

Description

Arlington began energy conservation measures with CETA funds. Since that time, the minimal expenditures required by the program have been absorbed into the local budget. At the basis of Arlington's effort is an effective monitoring program that allows tracking of energy consumption. To gauge the success of energy conservation practices and to determine whether or not a building is energy efficient, an Annual Efficiency Index (A.E.I.) is taken. Walk-through audits were conducted in each of the system's fifteen schools to identify low cost areas for correction. Twenty areas were targeted for correction or implementation. Among these are the development of a form for school personnel to monitor and control oil deliveries and check readings of electric and gas meters. Plans were also developed for major capital expenditures to implement conservation practices. The school system works in close cooperation with the town to effect an energy program for the community as a whole.

Efficiency (assurances/claims or cost savings)

An overall energy savings of 20 percent during a two year period is attributed to a low cost conservation program. Expenditures for redirecting existing personnel were minimal as were those for supplies and materials.

Availability

A case study is on file MG-602.

Contact Person

Jerry Houghton
Business Manager
23 Maple Avenue
Arlington, MA 02174
(617) 646-1000

MG-602

Title — Energy Conservation Practice
Attleboro Public Schools

Description

The administration of the Finberg School received a mandate from the insurance inspector to replace the boilers, both of which dated to 1929. When it was determined that installation of a new heating system by a private company would cost in excess of $70,000, alternative ways for compliance were investigated. A civil engineer was retained to prepare drawings and specifications for boilers, burners, and controls. Jobs were then analyzed and broken down into components for subcontracting to smaller companies proven to operate at costs below those of larger firms. Work was begun with a $30,000 appropriation; additional funds were drawn from the maintenance budget. The following year this successful project was replicated at another school.

Efficiency (assurances/claims or cost savings)

Oil consumption was reduced by 9,608 gallons in FY '78, and further, by 4,804 gallons in FY '79.

Availability

Bid specifications are available from the school district.

Contact Person

Robert J. Siminski
Director of Funds and Facilities
Rathburn Willard Drive
Attleboro, MA 02703
(617) 222-0012

MG-615

Title — Energy Conservation Practice
Bellingham Public Schools

Description

This district-wide program reduces fuel consumption and electrical costs in seven buildings by instituting many energy conservation practices, modifying buildings, and replacing inefficient equipment. Energy-efficient retention head burners that use #2 oil replaced outdated equipment in the North and Pinecrest Schools. At Pinecrest, four windows per classroom were eliminated and made into insulated panels. Utilizing glass from eliminated windows, the two remaining windows in each class were made two-glass-thick with one-inch air spaces. At the Macy School, top sashes of all windows were panelled and are now used as bulletin boards. Bottom sash is left intact. South Administration Building (circa 1900) underwent major renovation. The building was gutted and all walls were insulated, all ceilings were lowered, insulation was added above all ceilings, and all windows were decreased in size to accommodate new combination windows. In addition, the heating system was changed from steam to hot water and each room now has an individual thermostat control. In all schools, hallway lighting is reduced 50%, outside air on univents is decreased to a minimum. Boiler water temperature has been lowered from 200 degrees to 170 degrees, domestic hot water has been reduced from 140 degrees to 120 degrees and school thermostats are held at 67 degrees and 65 degrees during elementary and junior-senior high school hours and lowered to 55 degrees when school is not in session. Custodians use automatic and manual switching and are extremely conscientious in making certain that energy-saving practices are being instituted.

Efficiency (assurances/claims or cost savings)

(1) Estimated savings in two schools totaled $5,800 the first year with a $6,600 one-time expenditure. (2) Total savings for all the system's seven buildings have not been computed. Savings for 1980-81 will completely recover the cost of capital improvements.

Availability

Bid specifications for lighting modifications are available for view.

Contact Person

Mr. Francis J. Gardella
Director of Maintenance
Bellingham Public Schools
11 South Main Street
Bellingham, MA 02019
(617) 883-1706

MG-799

Title — Energy Conservation Practice
Billerica Public Schools

Description

This practice allows maintenance of accurate energy expenditures and monitoring for the current year. The program is written in COBOL on a Hewlett Packard Computer. Programs were written to make conversions of fuel types to MBTU's and prepare summaries of total energy used. Data can be analyzed according to several variables: per pupil costs by building; units of energy consumed per square foot; BTU consumption per square foot; and BTU consumption per square foot per degree day. Comparisons of monthly budgeted amounts are made for the year to date. This eliminates monthly detail work and provides accurate, timely data for analysis and annual record keeping. Monthly reporting system lets the school district compare current energy use for each school with use in previous years, as well as with other schools in the system. When unexplained differences are noted, attention is given to the problem. Action taken results in preventive maintenance. The business manager is able to compile actual energy consumption in base units, converted to MBTUs and thus compare with budgeted amounts. Summaries are available by month and by school and for total system

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Efficiency (assurances/claims or cost savings)

An estimated savings of 10 man hours per month for the record keeping based upon a $600 initial expenditure for programming.

Availability

A data processing tape of programs and documentation is maintained by the school district.

Contact Person

Ed Kazanjian
Business Manager
Billerica Public Schools
390 Boston Road
Billerica, MA 01821
(617) 667-2142

MG-801

Title — Energy Conservation Practice
Blackstone-Millville Regional School District

Description

One facet of Blackstone's conservation program centered on lighting adjustments in an elementary school. At the A.F. Maloney School gym all 500 watt incandescent bulbs were replaced with 175 watt mercury vapor lights. This resulted in a monthly 8 percent reduction in kilowatt-hour usage. There was no need to use staging to replace the bulbs. Other energy conservation measures date from 1976 and include delamping, adjustment of the dampers in the ventilating/heating system, changes in entrances and exits, and significant modifications in the building envelope of the oldest school in the system.

Efficiency (assurances/claims or cost savings)

$469.10 was expended in lighting changes to achieve an 8 percent reduction or 366 kilowatt-hours monthly in electrical usage.

Contact Person

Mr. Thomas J. Cullen
Superintendent of Schools
Lincoln Street
Blackstone, MA 01504
(617) 883-9203

MG-616

Title — Energy Conservation Practice
Bristol-Plymouth Regional Technical School District

Description

Honeywell Building Operation Service System (BOSS) was installed to provide control of building heating. The BOSS energy consumption report for April, 1979 to March, 1980 documented a cost avoidance of $55,045 for gas, oil and electricity. The regional technical school services 950 students. Training procedures were instituted through the Commonwealth of Massachusetts energy audit procedure, the MIT energy conservation course, and area energy conferences. Procedures called for setting back thermostats, water temperatures and installing water saver shower heads. Uniform use of electricity (from peak electrical load) was set as the goal. Energy saving lights were installed and windows and doors were caulked. In the second year, computerized control of air handlers, reheats, circulators, boilers and pumps were installed as required for consistent and even temperature throughout the building. Faculty and students were educated on the merits of energy conservation in a large building and practices for home use were demonstrated.

Efficiency (assurances/claims or cost savings)

Cost of installation was $8,600. An estimated 20%+ was conserved for the 1978 fiscal year as compared with 1977. (Oil 35%; electricity 6%).

Availability

The plant engineer will discuss procedures by telephone. Bid specifications are available for viewing.

Contact Person

Richard J. Bradley
Plant Engineer
Bristol-Plymouth Regional School
940 County Street
Taunton, MA 02780
(617) 823-5151

MG-749

Title — Energy Conservation Practice
Brockton Public Schools

Description

Brockton is a large urban system of forty-five school buildings. During the past three years an extensive program of insulation has been in progress with significant benefits in fuel cost reduction and improved building comfort. Since labor for the project was provided by CETA workers, the city was responsible solely for the purchase of materials which kept costs down. It was reported that schools built since 1950 were more in need of insulation than those of a much older vintage. Additional savings were realized through the creation of a position of control mechanic, thereby eliminating the necessity for costly contracting services. Other energy saving measures were the installation of fluorescent bulbs in place of incandescent and the replacement of old boilers, steam traps, thermostats and pneumatic controls. In July, 1979 an energy task force held its first meeting. This task force formulated an energy policy for school department approval. Cooperation by all involved is noted as being vital to an effective conservation program.

Efficiency (assurances/claims or cost savings)

A total one time charge of $55,000+ was invested in capital projects. The resultant savings in a one year period tallied $100,000 for electricity and $50,000 for fuel.

Contact Person

John J. Dorgan, Jr.
Building Superintendent
Office of Superintendent of Buildings
City Hall
Brockton, MA 02401
(617) 580-1100

MG-624

Title — Energy Conservation Practice
Burlington Public Schools

Description

One selected practice in Burlington was a reduction in electrical consumption through lighting and modifications. The prototype classroom at the Burlington High School has thirty fixtures, each with two 40 watt fluorescent lamps. Desk top light meter readings were 140-180 footcandles.* Changes consisted of totally deactivating nine fixtures, installing one 34 watt lamp and one Phantom Tube in eighteen fixtures, and replacing 40 watt lamps in three fixtures over the blackboard. After these adjustments, the light meter reading showed a desk top illumination of 30 footcandles. Since the ballasts (replaceable attachments to the fluorescent fixture) in the modified fixtures run cooler, their lifespan is longer. The total conservation program at Burlington is based on a plan submitted to the school committee by the director of plants and facilities. To get the program off the ground, inservice programs and workshops were held for administrators, teachers, and custodians; energy education materials were distributed; walk-through audits were conducted in each building; and responsibility for monitoring and enforcing conservation measures was assigned by administrative directive.

*A footcandle is a measure of the area and degree of illumination on a given surface.

Efficiency (assurances/claims or cost savings)

For the specific practice on lighting conservation a $186 expenditure in the prototype classroom resulted in an annual savings of $203. The payback period is eleven months.

Availability

A case study is on file MG-606.

Contact Person

Bernard Maslow
Director, Plants and Facilities
Center Street
Burlington, MA 01803
(617) 273-1870 Ext. 214

MG-606

Title — Energy Conservation Practice
Cambridge Public Schools

Description

The objective for one large all-electric elementary school was to capitalize on available energy conservation measures. A bid process was undertaken by the school department which focused on the length of payback, a specific savings guarantee, and sound bidder qualifications. The accepted vendor contracted to install its computerized energy control/maintenance system, TABS (Time-shared Automated Building Service). Other work was targeted at domestic hot water conservation, lighting changes, and repair of the heating, ventilating, and air conditioning systems. Cambridge is initiating a relamping project in Spring, 1981.

Efficiency (assurances/claims or cost savings)

The capital investment for TABS was $25,200. Annual operation and maintenance fees total $16,300. Savings realized from the measures implemented estimated at $30,000+ annually.

Availability

Brochures are available that describe the TABS control system. Relamping is in cooperation with MASBO CO/OP, Inc.

Contact Person

Oliver S. Brown
Assistant Superintendent
159 Thorndike Street
Cambridge, MA 02141
(617) 498-9253

MG-623

Title — Energy Conservation Practice
Central Berkshire Regional School District

Description

The energy cost reduction within this district was brought about by a program to make the entire school community aware of the energy situation and to create a commitment to conservation. Energy guidelines for the school year were drawn up and sent to all principals. Each principal was asked to designate an energy manager who was responsible for implementation and monitoring of the guidelines. During the course of the school year the building energy managers attended a series of workshops (one goal-setting session and periodic follow-up meetings) to further their efforts. Other energy saving measures were window caulking, lighting modifications, and burner replacement in several buildings.

Efficiency (assurances/claims or cost savings)

For FY '79 the total utilities budget of $193,000 was reduced by $16,000 (electric) and $23,000 (fuel).

Contact Person

Robert A. Gurek
Business Manager
Central Berkshire Regional School
Main Street
Dalton, MA 01226
(413) 684-0322

MG-610

Title — Energy Conservation Practice
Chelmsford Public Schools

Description

Chelmsford undertook a broad range of conservation techniques appropriate for individual facilities. Two measures, however, applied to all schools — evening temperature setbacks and closure of univent dampers with leakage allowed for ventilation to meet state requirements. New energy efficient inject-air oil/gas burners were leased from the Preferred Utilities Corporation for three schools, while BOSS (Building Operation Service System) was installed in another school for computer control of heating. BOSS regulates energy consumption at the school by allowing heating/cooling of occupied areas only. Duty cycling staggers electrical shutdowns and reduces run time. Burners were measured and adjusted for maximum efficiency and efforts were made to keep steam traps in good repair where applicable. Classrooms in two schools are converting from incandescent to fluorescent lighting as part of this system's conservation program.

Efficiency (assurances/claims or cost savings)

The cost of measures installed in the first year was $37,867; ongoing costs are given as $21,454. High school reported a savings in gas and electricity costs — $26,571. Four additional areas were then hooked up to BOSS in Fall, 1980.

Contact Person

Robert Theriouet
Head of Maintenance Department
250 North Road
Chelmsford, MA 01824
(617) 256-7811

MG-609

Title — Energy Conservation Practice
Dartmouth Public Schools

Description

An Energy Conservation Bulletin was issued to all school units outlining various measures to be followed to reduce the district's level of energy consumption. Temperatures are set no higher than 65 degrees when school is in session. When schools are unoccupied, temperatures are set no higher than low fire. Boiler watches enable closing down boilers when outside temperatures are 40 degrees or above. Emergency thermostats restart boilers when danger of internal pipe freezing is detected. Personnel are asked to help retain building heat by keeping all windows and doors closed. Window shades are kept up for improved passive solar heating and lowered completely after classes to insulate against heat loss. Exterior security, general area, and corridor lighting have been reduced. Skylights have been checked for adequate caulking and/or insulation. Classroom unit ventilators are set to use the minimum outside air quantity permitted by code. School unit exhaust systems are used only as needed and all unnecessary exhaust fans are disconnected. Energy managers are requested to verify that thermostat settings accurately reflect room temperatures and submit work requests to recalibrate and/or clean, repair, or replace faulty equipment. To help conserve gasoline, field trips are scheduled only when absolutely necessary.

Efficiency (assurances/claims or cost savings)

Many procedures required some investment of system maintenance funds and man-hours; however, estimated percentage of total use savings and the payback period for the work indicate that applying the measures is a wise investment. These are detailed in the Superintendent's Report.

Availability

A copy of the Superintendent's report is available.

Contact Person

John T. MacDonald
Dartmouth Public Schools
8 Bush Street
South Dartmouth, MA 02748
(617) 997-3391

MG-819

Title — Energy Conservation Practice
Fall River Public Schools

Description

To restrict the level of infiltration through old deteriorating sash and frames, old windows are being replaced with new aluminum windows. Old roofing systems are being replaced by new insulated roofs, and the antiquated boiler and water systems replaced by new and more efficient systems to reduce demand and lower usage. An audit determined which of the thirty-eight buildings in the school system were costing excessive dollars in heating costs. Architects and engineers were contracted and designs drawn up which were let out for bid. Heating controls were later added to the contract. Lexan windows were used, instead of glass for safety factors, although thermopane would also prove beneficial. The windows restrict the flow of air filtration and lessen heat loss. Expenditures were estimated as follows: windows — $426,139 for two schools; roofing in 8 schools — $577,000; and boilers for 5 schools — $325,147. Installation of fluorescent bulbs (to replace incandescent) and replacement of boilers with addition of heating controls were additional modifications.

Efficiency (assurances/claims or cost savings)

Savings were estimated at 40% for windows in 2 schools; 30% for roof on 8 schools and between 25% and 50% for boilers in 5 schools.

Availability

Contracts and specifications are available from the Director of Buildings and Grounds.

Contact Person

Robert J. Shaker
Director of Buildings and Grounds
School Buildings Division
Fall River Public Schools
106 Hartwell Street
Fall River, MA 02721
(617) 678-4571

MG-750

Title — Energy Conservation Practice
Gardner Public Schools

Description

The six building district has shut off from six to eight light fixtures in each classroom, corridor and gymnasium. The School Department used the Department of Public Safety's footcandle lighting standard to reduce the electrical use in the buildings. In addition, each head custodian submitted a monthly fuel, gas and electrical reading with a detailed breakdown as to the weekly consumption. As a result two schools went from a demand electrical meter to a nondemand meter rating. The goal for 1980/81 is to reduce energy consumption by 8-10% over 1979/80. All public activities are limited to only the high school and an energy or user fee is charged agencies using the school after hours. This fee is made out directly to the electrical or fuel contractor and is used as an offset to reduce the monthly energy bill. At each school an energy chart visible in the Principal's office and one in the Superintendent's office are updated monthly showing the energy consumption compared to the previous year in MBTU's. The cost savings for 1979/80 amounted to over $72,000, enabling the School Department to buy a new school bus and thereby reduce the transportation amount by an additional $35,000. The 1980/81 goal of 8-10% reduction over the previous year will amount to over $25,000 in savings. This amounts to $132,000 in savings in a one year period (i.e., 1/10 the total operation and maintenance budget for the school district).

Efficiency (assurances/claims or cost savings)

Gardner reported a 29% reduction for FY '80 over the FY '79 period.

Availability

Printed materials on lighting requirements by D.P.S. and data sheets concerning energy procedures are available.

Contact Person

Donald W. Kimtis
Assistant Superintendent
for Business Affairs
City Hall, Room 226
Gardner, MA 01440
(617) 632-1000

MG-732

Title — Energy Conservation Practice
Gateway Regional School District

Description

The Gateway Regional School District has implemented a comprehensive energy savings program. Heat loss from the building envelope has been reduced, energy inefficient lamps have been replaced, delamping has been completed, and light control has been modified. Use of the secondary schools and several elementary facilities has been limited to two nights and one night per week, respectively. All 3:30 buses have been eliminated at the high school; however, three weekly 5:00 p.m. routes allow continuation of afternoon activities. Greater control of athletic contests with regard to number of games per sport was approved by the school committee and incorporated into the teachers' contract. Recently eighteen areas (of nineteen) in the first phase of "A Two Phase Energy Conservation Program" received school committee approval and are now in effect.

Efficiency (assurances/claims or cost savings)

The projected savings in fuel oil consumption for FY '80 is 30,000 gallons or $15,000. In three years there has been a 200,000 kilowatt-hour drop in electricity use, attributable to lighting modifications in the auditorium/gymnasium. Investments for controls; adjustments for the heating, ventilating, and air conditioning systems; and lighting fixtures tally $18,100.

Contact Person

Duane L. Wyman
Assistant Superintendent
Littleville Road
Huntington, MA 01050
(413) 667-3475

MG-611

Title — Energy Conservation Practice
Hampshire Regional School District

Description

In 1974 the Hampshire Regional School District began reviewing expenditures for fuel oil and electricity. Following this initial phase, several committees began a long range program of capital improvements such as insulating buildings and installing new burners. In 1977 an energy manager was trained by the Massachusetts Office of Energy Resources and retrained in 1979. Over a two year period figures show an annual drop of 55,598 gallons in oil consumption and 130,474 kilowatt-hours in electricity usage. The most recent statistics show the possibility for an additional savings of 10 to 26 percent. Program support by all school system personnel is viewed as basic to a successful conservation effort. To further conservation goals, a memorandum to staff members enumerated twenty-one areas for potential savings and solicited additional suggestions.

Efficiency (assurances/claims or cost savings)

Savings of $50,275 estimated for 1979-80 with a total expenditure of $34,157 since 1973.

Availability

A case study is available on file MG-603.

Contact Person

Richard E. Dragon
Assistant Superintendent
Main Street
Williamsburg, MA 01096
(413) 268-7770

MG-603

Title — Energy Conservation Practice
Hingham Public Schools

Description

In 1979, acoustic ceiling tile and insulation projects were undertaken at the Plymouth River Elementary School, a 10-year-old, all-electric structure housing 600 pupils. Formerly a cathedral ceiling was in place which was lowered when the insulation was added. In Fall of 1980, replacement of windows was undertaken at the Central Junior High School and South Elementary School. Both of these buildings are approximately 50 years old and there are 100 windows per school. Replacement windows are all aluminum with insulated metal panels, porcelain enamel, and look like window shades from the outside. In between metal panels, there is insulation. Frames are light in color to match the exterior design of the building. When selecting replacement windows, appearance was taken into consideration to preserve the historic atmosphere. In the South Elementary School, boilers and burners were replaced with new equipment. A gas/oil burner option is now in place so both fuels can be used depending upon supply availability and costs.

Efficiency (assurances/claims or cost savings)

The window replacement at Central Junior High School and South Elementary School produced an estimated savings as high as 20% for the 1980-81 school year. Total costs incurred at the Plymouth River Elementary School were $36,942 ($13,385 for insulation and $23,557 for ceiling tile).

Availability

The business manager will provide descriptions of the window replacements and other retrofitting.

Contact Person

Robert Novelli
Business Manager
Hingham Public Schools
14 Main Street
Hingham, MA 02043
(617) 749-2180

MG-827

Title — Energy Conservation Practice
Lexington High School

Description

Lexington High is a complex of buildings constructed in 1951, with additions in 1955 and 1962. Total square footage is 312,574. Most of the units are two story and built of brick with varying degrees of insulation and a variety of mechanical and electrical systems. Approximately 60% of the exterior surface is comprised of windows. Prior to the energy audit conducted in 1978-1979, the school complex used 12.5 BTU/sq. ft./degree day. If the audit recommendations are thoroughly followed, the consumption rate may be reduced to as little as 6.4 BTU/sq. ft. Major recommendations were carried out in weatherstripping doors and sealing windows. Procedural changes (tuning the thermostat system) and modified equipment were also recommended by the energy audit.

Efficiency (assurances/claims or cost savings)

Annual savings for 1980-1981 estimated at 20%-30% over previous years.

Contact Person

Mr. James MacInnes
Administrative Assistant
Lexington Public Schools
1557 Massachusetts Avenue
Lexington, MA 02173
(617) 862-7500

MG-764

Title — Energy Conservation Practice
Littleton Public Schools

Description

Littleton reported two specific energy practices. One involved the replacement of two hot air furnaces with two steam boilers plus a heat transfer coil. The high school is now heated more efficiently since the boilers run less but provide a steadier heat. Additionally, the coil emits residual heat even when the boilers are not operating. Since the conversion the school's hot water tank has been replaced with five insulated aqua-boosters. The second practice entailed resurfacing and simultaneously insulating the roof over the gym. It was discovered that for slightly twice the price of resurfacing, the gym roof could be insulated by coating a sprayed urethane foam with silicon. Since 1975 there have been no leaks in the roof and a similar approach has been used at another school.

Efficiency (assurances/claims or cost savings)

In FY '78, 92,000 gallons of oil were used at the high school. After the conversion, consumption dropped to 68,000 gallons, a savings of 26 percent. No cost data is available for the gym roof since use of this facility has increased significantly since the time of resurfacing/insulating.

Contact Person

John Hathaway
Assistant Superintendent
for Business
Shattuck Street
Littleton, MA 01773
(617) 486-8951

MG-625

Title — Energy Conservation Practice
Lunenburg Public Schools

Description

Since 1972, cost for service and maintenance of heating controls has been budgeted at Lunenburg on an annual basis. In addition to the updating and repair of control systems, a system of preventative care has been established. Other energy conservation measures include boiler updatings, temperature regulation for days and evenings, lighting alterations, and exterior recaulking and painting. In the spring of 1979, Lunenburg retained an architect to assist in modifying all facilities for compliance with regulations for curriculum, the handicapped, and energy conservation. A preliminary energy audit was completed in the fall of 1979 by the Gardner CETA consortium and Worcester County Extension Service.

Efficiency (assurances/claims or cost savings)

A comparison of fuel oil consumption (FY '73 and FY '79) shows a decrease despite increased use of facilities. Reduction of fuel costs is estimated to be 25 percent.

Availability

The final energy audit is on file at the Massachusetts Office of Energy Resources.

Contact Person

Burton E. Goodrich, Jr.
Assistant Superintendent
1033 Massachusetts Avenue
Lunenburg, MA 01462
(617) 582-7711

MG-608

Title — Energy Conservation Practice
Minuteman Regional Vocational Technical School

Description

Energy conservation was begun at Minuteman when this regional vocational school contracted with the Massachusetts Association of School Business Officials (MASBO CO/OP, Inc.) for assistance in implementing a viable program. As a beginning point MASBO CO/OP, Inc. provided instructional memos to school personnel directing adherence to energy saving practices, constructed a walk-through energy audit, and explained how to interpret computer information. The computer (a microprocessor) was installed by the American Energy Management Corporation in the spring of 1979. It supplies daily usage data for electricity and allows for monitoring and control. Two projects which were begun in 1979, and completed in 1980, were a relamping program and modifications in the automatic temperature control systems. Curtailment of the operating time for space conditioning fans, reduction in the supply and temperature of domestic hot water, and preventative burner maintenance are representative of other energy saving practices. Reorganization of the school calendar as well as after-school use of the building are under consideration.

Efficiency (assurances/claims or cost savings)

The projected savings for FY '80 total $71,591. Included in this amount is $24,080 attributed to the microprocessor used for control of electricity. Expenditures for the same period are estimated at $25,558.

Availability

MASBO CO/OP, Inc. will discuss these practices for technical assistance.

Contact Person

Edward Hanlon
Director of Maintenance
Route 2A
Lexington, MA 02173
(617) 861-6500

MG-622

Title — Energy Conservation Practice
Natick Public Schools

Description

Concern with reducing energy costs has been a focus in Natick for some time. A recent activity was directed at reducing electrical usage with maintenance or improvement of present lighting. A pilot program was undertaken at the junior high school gymnasium which involved replacing thirty 500 watt incandescent fixtures with twenty-four 250 watt high pressure sodium vapor lamps. Prior to installation of these new lamps an engineering study predicted a 60 percent reduction in electricity consumption while maintaining the existing footcandle* level. Based on the success of the completed project a similar replacement program has been started at the high school.

*A footcandle is a measure of the area and degree of illumination on a given surface.

Efficiency (assurances/claims or cost savings)

Since there is no separate meter for the gymnasium, specific documentation is not available. The reduction evidenced in the following comparative data is attributed principally to use of the sodium vapor lamps. In October and November 1978, 55,900 and 54,000 kilowatt-hours were used compared to 39,240 and 46,800 kilowatt-hours, respectively, for the same period in 1979. The engineering study predicted an annual savings of $1,483.44 in operating costs.

Contact Person

Business Manager
13 East Central
Natick, MA 01760
(617) 653-0550

MG-626

Title — Energy Conservation Practice
North Andover Public Schools

Description

The goal of this program at North Andover High School was to reduce cost and conserve energy in an all-electric facility which was first occupied in 1973. A complete audit of roof top electric heating units was performed by a heating control company. Concomitantly, the Honeywell BOSS (Building Operation Service System) was installed to permit two full heating seasons as well as the control of building equipment and condition. The year prior to installation, the kilowatt-hour usage was 3.7 million; the following year showed a 2.3 million kilowatt-hour usage or a reduction of 40 percent. Designed to consume an annual 3 million kilowatt-hours, the building is now operating at 24 percent under this original plan with reported improvement in system control and building comfort.

Efficiency (assurances/claims or cost savings)

The first year brought a cost reduction of $53,000 on an investment of $17,000. For subsequent years, a savings of $50,000+ is projected for an ongoing cost of $9,000. This practice was nationally validated by ASBO in 1980.

Availability

A case study is on file MG-607. The validation report is also available.

Contact Person

Fred Rex
Assistant to the Superintendent
Atkinson School
North Andover, MA 01845
(617) 682-5231

MG-607

Title — Energy Conservation Practice
Northbridge Junior-Senior High School

Description

This comprehensive energy conservation program details specific suggestions for decreasing heat and lighting expenses in the junior-senior high school including reduced thermostat setting, assorted lighting modification, reduction of domestic hot water setting, ventilation shut-down of unoccupied areas or hours, and boiler and furnace adjustment. Categorized as no cost or low cost items, the conservation measures advocated should result in fuel oil reductions of 25% or more.

Efficiency (assurances/claims or cost savings)

The Annual Efficiency Index shows that a 17% change occurred between FY 1978 (172) and FY 1979 (143). A savings of $25,229 for 1979 was estimated.

Availability

Data sheets concerning energy audit are available from Merrimack Education Center and MASBO CO/OP, Inc. will discuss these procedures for technical assistance.

Contact Person

Richard Eion
Head Custodian
Northbridge Junior-Senior
High School,
Linwood Avenue
Whitinsville, MA 01588

MG-730

Title — Energy Conservation Practice
Orange Elementary Schools

Description

Conservation efforts undertaken by the Orange elementary schools included window caulking, the installation of new doors and insulation, and peak burner maintenance. A particularly interesting effort was directed at the heating systems: two pipe systems which have layouts with both hot and cold areas but only one thermostat and one zone to a building. Individual controls have been put on each steam radiator; these thermostatically controlled valves can be set at different temperatures. If there is an immoderate temperature in one area, the local radiator valve will adjust the heat in response to it. New smaller burners have been installed to heat water when heat is not being required from the main system. This latter practice has resulted in additional savings.

Efficiency (assurances/claims or cost savings)

The installation of the valves cost $40 per radiator with an estimated payback period of one year. In FY '74, 62,000 gallons of oil and 341,000 kilowatt-hours of electricity were used. FY '79 showed a decrease to 34,000 and 231,840, respectively.

Contact Person

David P. Bramhall
Superintendent of Schools
East Main Street
Orange, MA 01364
(617) 544-6763

MG-614

Title — Energy Conservation Practice
Oxford Public Schools

Description

This energy conservation program describes techniques as they apply to school facilities and provides for student awareness with regards to the study of alternative energy sources. A Solar Energy Economy Greenhouse was funded by the U.S. Department of Energy under technology small grant program. The science and math departments at the high school utilize the greenhouse model. A building was constructed in cooperation with the French River Teacher Center that utilizes a passive solar design and serves as a solar laboratory. Weatherstripping, replacement of incandescent lights and phantom tubes were carried out in a previous year.

Efficiency (assurances/claims or cost savings)

Average payback period for all measures listed is 4.5 years. Dollar savings calculations were computed at the rate of .70 for No. 4 fuel and approximately .062 per KWH for electricity. Energy cost savings were computed for four elementary schools, the middle school and high school separately.

Availability

Utilizes brochures and 16 mm film available from Tenneco, Houston, Texas.

Contact Person

Daniel W. Ivascyn
Assistant Superintendent
for Business Affairs
Oxford Public Schools
5 Sigourney Street
Oxford, MA 01540
(617) 987-8900

MG-793

Title — Energy Conservation Practice
Quincy Public Schools

Description

Plans for the implementation of low cost conversion techniques and potential capital investment measures were undertaken in the fall of 1973. The consolidation of essential after-school programs, reduction in temperature, and after-school drawing of shades and curtains are representative of individual building efforts to conserve heat and light. The Lincoln Hancock Community School, an all-electric elementary school, is opened seven evenings a week and energy usage is very high. However, monitoring revealed that electrical consumption steadily increased 15 percent from January 1974 through June 1978. An in-house investigation yielded the following remedies: the thermostats were cleaned, recalibrated, and placed on walls rather than in air ducts; and the building was rezoned for lighting. Two maintenance men were given instruction in pneumatic controls. In 1979, four fluorescent tubes and one ballast were removed from 500 fixtures and two watt miser tubes were installed. All unit ventilators were adjusted and recalibrated and outside air was reduced in accordance with the state code. Heat was regulated to comply with federal guidelines with maximum evening shutdown.

Efficiency (assurances/claims or cost savings)

The projected saving for FY '80, using FY '78 as the base year, is 860,000 kilowatt-hours or 25 percent of FY '78 consumption. $3,600 was expended for in-house electricians' labor.

Availability

A case study is on file at the Merrimack Education Center (MG-618).

Contact Person

John M. Browne
Plant Director
70 Coddington Street
Quincy, MA 02169
(617) 786-8786

MG-618

28.

Title — Energy Conservation Practice
Springfield Public Schools

Description

This practice has as its overall goals the conservation of energy in the schools and the education of students in problems related to energy use. Changed attitudes of students and staff as well as training for custodians were key elements. Each school has an energy management team that works with the system-wide energy committee. Daily recording and charting of energy use provide a monitoring and reporting system. Structural improvements, and insulation of windows, weatherstripping and change from No. 2 fuel to No. 4 fuel and gas combination resulted in the savings reported. Combination natural gas-oil burners were installed in five schools to allow for fuel use of both types. All lamps were replaced with Watt Miser fluorescent tubes. Capacitors were installed on all motors at the New North Community School. Concepts for energy conservation in grades K-6 include conservation, at school and at home, forms of energy and energy alternatives, value choices regarding alternatives. Materials are suitable for reproduction and use in classrooms as well as for display ideas. The secondary curriculum guide illustrates energy topics that can be incorporated into the sciences, social studies, language arts and other regular academic subjects. The teacher resource section of this curriculum guide presents useful background information and references.

Efficiency (assurances/claims or cost savings)

Window Insulation Program in the Brookings School resulted in 17,094 gallons saved with a payback period of 7.1 years. Savings represented 14% on the fuel bill in 1979-80 ($322,722 at a per gallon cost of 84 cents). An estimated $112,000 was spent on the oil heater and new burners. The City Council reported a town-wide savings of 614,403 gallons of fuel oil (a 15% decrease).

Availability

Activities/ideas are available for grades K-6 and a teacher's manual on energy conservation for grades 7-12 (see MG-791).

Contact Person

Stanley J. Mulak
Energy Conservation Chairman
Springfield Public Schools
195 State Street
Springfield, MA 01103
(413) 787-7178

MG-756

Title — Energy Conservation Practice
Stoneham Public Schools

Description

To lower energy costs for electricity and fuel oil, the Johnson controls were installed at a cost of $8,493 in capital outlay and with a $437 monthly maintenance charge. Estimated savings are expected to more than recover the initial outlay. The building is monitored remotely from the Johnson Control Monitoring Station, Woburn, Massachusetts. The Time-Shared Automated Building Service System (TABS) was installed at the Junior High School. This system consists of a series of sensors, switches, relays, transducers and controls necessary to provide effective and efficient operations of all heating and ventilation systems and is connected via telephone lines to a monitoring center that is staffed on a twenty-four hour basis. Energy requirements are based upon occupancy and school administration specifications (varies during school day and accommodates nighttime and weekend use of the school). The TABS automatically starts and stops equipment according to occupancy/time promoting longer equipment life and better utilization of manpower. By adjusting for minimum energy usage during downtime, while maintaining economical warmup or cooldown, TABS reduces energy required and decreases fan run time. Load cycling further reduces electrical consumption by intermittently starting and stopping preselected equipment for short periods of time throughout the day. Savings projected over twelve months allow a return on investment that would be realized in a payback period of thirteen months. Installation was completed at the Junior High School in January, 1980 and will be added to another building in 1981.

Efficiency (assurances/claims or cost savings)

Total savings of $36,090 are estimated. Savings from reduced oil consumption (33,086 gallons) will result in approximately $28,453. Electricity savings (88,800 KWH) should be about $7,637.

Availability

Brochures, specifications and contract are available from the school district contact person.

Contact Person

John F. Conway
Business Manager
Stoneham Public Schools
149 Franklin Street
Stoneham, MA 02180
(617) 438-0600

MG-818

Title — Energy Conservation Practice
Tewksbury Public Schools

Description

The Tewksbury delamping project was completed in a week and a half by a three person maintenance crew trained by an electrician. The plan was developed on the basis of the mandatory lighting code audit. Using a light meter, custodians check lighting in classrooms, corridors and storage areas, and adjust lighting so that it does not exceed the State Department's standards (e.g., 30 footcandles* of light over each *work* area). Special emphasis is directed at adequate classroom lighting. In some cases a bulb was removed; in others the ballast (a replaceable attachment to a fluorescent fixture) was also disconnected. It is recommended that this latter disconnection be held for a lighting observation period of one month. In addition to delamping, conservation stickers on light switches increased program visibility and contributed to energy savings by the entire school community.

*A footcandle is a measure of the area and degree of illumination on a given surface.

Efficiency (assurances/claims or cost savings)

At the time the project was being considered the electrical usage for FY '76 was compared to the projected consumption for FY '78. On this basis it was estimated that $17,000 would be saved.

Availability

A case study is on file MG-604.

Contact Person

Frank Antonelli
Administrative Assistant
1469 Andover Street
Tewksbury, MA 01876
(617) 851-6248

MG-604

Title — Energy Conservation Practice
Wellesley Public Schools

Description

Audits have been completed on all buildings in the Wellesley system. Two resulting energy conservation measures were the modification or installation of windows and doors, and an extensive oil burner project. As with other energy efforts, this latter one was completed over a period of several years. It involved the purchase and installation of eleven oil burners. Other conservation directions focus on maintenance and ongoing education. To insure proper equipment operation, maintenance personnel attended company schools as needed. Monthly instructional sessions on energy and related building operation issues are attended by head custodians who also meet annually on a multi-town basis. All energy seminars offered by the Massachusetts Office of Energy Resources are attended by system personnel.

Efficiency (assurances/claims or cost savings)

Over a period of several years, eleven new oil burners have been purchased at a cost of $132,000. The investment has resulted in an annual savings of $25,200 or 15 percent of the system's energy costs.

Contact Person

Frederick L. Jaeschke
Director of Buildings and Grounds
12 Seaward Road
Wellesley, MA 02181
(617) 235-7250, Ext. 121

MG-621

Title — Energy Conservation Practice
West Springfield Public Schools

Description

For two years, the West Springfield Public Schools has affected a significant reduction in oil consumption by turning off boilers completely at designated times. If temperature is over 30 degrees, boilers are shut down at 1:00 p.m. weekdays. On weekends a building checker periodically visits all ten schools to check temperatures and make necessary adjustments to prevent pipes from freezing. If building temperature is below 40 degrees, boilers are turned on for a short period so that repairs to frozen pipes have been minimal.

Efficiency (assurances/claims or cost savings)

During 1978-1979, before this procedure was adopted, 496,000 gallons of oil were used. In 1979-1980, approximately 300,000 gallons of oil were used and during 1980-1981, consumption is expected to be about 400,000.

Availability

Copy of Rules and Regulations is available.

Contact Person

Mr. Alan Smith
Director of Maintenance
West Springfield Public Schools
26 Central Avenue
West Springfield, MA 01089
(413) 781-7550

MG-766

Title — Energy Conservation Practice
Westfield Public Schools

Description

As early as 1974, Westfield began a conservation program entailing capital outlay as well as significant involvement by the total school community. This local effort is characterized by the fulltime position of an energy conservation coordinator who was appointed in 1978. The coordinator is a member of the highly effective eight person "house" energy team that meets monthly in an attempt to bring conservation directly into the classroom. Specific tasks include dissemination of an "Energy News Letter" and formulation of recommendations to the staff, superintendent, and school committee. A 15 percent reduction in energy consumption over the preceding year was the goal of the Westfield system for FY '79. In FY '80 it is hoped that this reduction can be increased to 20 percent.

Efficiency (assurances/claims or cost savings)

FY '79 oil consumption was reduced to 469,890 gallons from the 573,178 gallons used in FY '78. For the same period, electrical usage was cut from 3,356,657 to 2,729,563 kilowatt-hours. The combined decreases represented a savings of a little more than $70,000.

Contact Person

James F. Shea
Business Manager
30 West Silver
Westfield, MA 01085
(413) 568-9592, Ext. 407

MG-612

Title — Westford's Energy Awareness Leads To Happiness — W.E.A.L.T.H.

Description

This utility conservation program using an incentive system allows building principals to share utility savings by spending on their individual schools money that would otherwise have gone for utility use. A report is prepared on energy use to inform each school of the money it has saved. Thus the utility budget funds are redirected to educational and instructional needs. Awareness of utility costs and appreciation of conservation are fostered among staff and students.

Efficiency (assurances/claims or cost savings)

A comparison study of the past three year period, 1977/78 through 1979/80, revealed an average 25% decrease in consumption of electricity and heating fuel in seven out of eight school buildings. Only one school showed an increase in MBTU's, partially attributable to increased usage of the building and added equipment. Due to rapid and continuing rise in fuel costs, however, the savings realized in consumption were not sufficient to offset increased cost.

Contact Person

John Crisafulli
Assistant Superintendent
Westford Public Schools
35 Town Farm Road
Westford, MA 01886
(617) 692-4783

MG-729

Title — Energy Conservation Practice
Westminster Public Schools

Description

This energy conservation program for schools serving grades 7-12 is one building. Simplex installed the system in August, 1980. Overhead fans, vents, etc. are staggered and run at reduced speed. Oakmont High School is testing the Simplex system whereby normal wall socket is used to carry computer code in lieu of hard wire. Simplex Time Recorder Company provided consultation and technical assistance. The Principals and the head custodian attended one day workshop for instruction in the operation of the computer system. All the associated motors on roof, etc. were checked while electricians installed the equipment. Up to 256 discrete local and remote control circuits comprise the Simplex 2400 energy management system. Devices such as lights, heating, ventilating and air conditioning records were kept for 1979-1980 and will be compared with the 1980-81 school year. Percent savings are recorded for each school. An expected use is projected based upon pre-energy crisis usage (1971-1974). Additionally, degree days are recorded from the Worcester weather bureau. Other minor modifications have been made in lighting at the elementary schools, and the school administration office indicates that removing 100 4-ft. fluorescent tubes represents an estimated savings of $7.00 per tube/per year. Hot water heating changes were made that will pay for themselves in one year. Combining all lines on one meter by replacing a system that used three meters is estimated to save an additional $900/year.

Efficiency (assurances/claims or cost savings)

A field test price of $4,345 was expended with an estimated payback period of 7.7 months. Data is now being collected on cost-efficiency.

Availability

Energy Facts is published by the school administration office as material becomes available and disseminated to all schools.

Contact Person

John W. Davis
Assistant Superintendent
Westminster Public Schools
103 Main Street
Westminster, MA 01473
(617) 874-5314

MG-781

Title — Energy Conservation Practice
Weston Public Schools

Description

Since the fall of 1973 Weston has adopted a broad-based approach toward energy conservation, directed at energy audit and technical assistance. Common sense changes in operations and maintenance are emphasized. The school system has availed itself of the invaluable expertise of town residents in energy related professions, who have assisted in targeting priority areas. Forecasting long-range maintenance needs has permitted major energy conservation projects to proceed along with facility renewal. Transformers were purchased for the secondary school and mechanical/electrical changes were made in the heating and ventilating plants. Modifications included tamper-proof thermostats (night settings), putting exhaust fans on time clocks, insulation of roofs, boiler cut-backs and delamping.

Efficiency (assurances/claims or cost savings)

Approximately $60,000 was spent to change the lighting system and to purchase transformers. Comparing 1973 to 1979, oil consumption dropped from 430,398 gallons to 239,433 gallons, kilowatt-hours usage decreased from 2,748,162 to 555,462, and gas usage decreased by about 50 percent. Costs avoided over base year (FY '73) totalled $543,856. Consumption statistics indicate oil and electricity usage went down in the range of 40% per pupil.

Contact Person

William Keane
Director of Buildings and Grounds
89 Wellesley Street
Weston, MA 02193
(617) 899-0620

MG-605

Title — Energy Conservation Practice
Westwood Public Schools

Description

An energy audit was conducted in Spring, 1979, and an energy conservation program begun. One specific energy saving practice for this school system consisted of replacing incandescent with fluorescent lights in two schools. Although the total number of watts was reduced, the actual footcandles* at the desk-top and blackboard levels increased and both teachers and students found the room brighter. This was a beginning point in a system-wide evaluation of the lighting program, which included elimination of 50 percent of the corridor lighting fixtures, and an efficiency evaluation of exterior lighting. A number of other projects have been completed: all shower heads were replaced with low volume nova heads; the hot water system temperature was lowered to 140°, the pool temperature to 78°. Completion of thermal and acoustical insulation of all buildings, plumbing and heating renovations, along with the installation of auxiliary hot water systems, several major electrical renovations and finally replacement glazing in all schools resulted in additional savings. (50% of the existing windows were replaced by thermal panels.)

*A footcandle is a measure of the area and degree of illumination on a given surface.

Efficiency (assurances/claims or cost savings)

As a result of lighting modifications, one school had a monthly reduction of 3,720 kilowatt-hours while a second school saved 2,996 kilowatt-hours for this same period. Funding of $291,000 was received from the Department of Energy. Other modifications resulted in substantial savings in the fuel budget.

Contact Person

Leo J. Crowe
Assistant Superintendent
for Business Affairs
660 High Street
Westwood, MA 02090
326-7500

MG-617

Title — Food Service Management
Chicopee Public Schools

Description

This centrally managed system-wide practice focuses on management records, purchasing, scheduling and promotional ideas. Utilizing results of a study outlining what students wanted for lunch, planners schedule three choice entrees every day in all schools. Teachers report menu choices each morning as children get tokens designating Selection A, B, or C. This system guides chefs in preparing sufficient quantities of food. Each month Chicopee High Graphic students produce 10,000 menus, which also serve as school calendars, for paper costs only, about $100.00 each month. Advertisement space on the menus is sold. An increase in pizza, hamburg, beef and bacon purchasing (increase of 400%/volume) has resulted in reduced price per pound. Hotel administration faculty from the University of Massachusetts, Amherst, offered personnel training.

Efficiency (assurances/claims or cost savings)

Savings are estimated at $18,000. Revenue from advertising averaged $480/month over the first 3 months.

Availability

A sample menu is provided; menus also feature elder food service program.

Contact Person

Frederick R. Beauchene
Director of School Cafeterias
180 Broadway
Chicopee, MA 01020
(413) 592-6111, Ext. 453

MG-797

Title — School Food Service Management
Framingham Public Schools

Description

Seven commissaries with 15 satellites were centralized in this coordinating effort to 4 commissaries with 18 satellites. This enabled the elimination of 3 head cooks and reorganization of the satellite manager's role. The private serving line for teachers was eliminated to save direct labor costs and teachers are able to purchase meals in the student's line. Labor costs were decreased and greater control is maintained in both cost-effectiveness and quality of the ultimate product. The central coordination also provides better inventory control. Average salary per cook is $8,000 per year. Visibility of the teacher in the student serving line is a spin-off benefit for lunchroom control.

Efficiency (assurances/claims or cost savings)

A decrease in labor costs resulted from the new staffing pattern.

Contact Person

Bernard Zecker
Director
Framingham School Food Service
64 Prior Drive
Framingham, MA 00701
(617) 877-6931

MG-787

Title — School Food Service Management
Granby Public Schools

Description

Each school prepares its own meals and each unit is self-contained. The foods services are administered by a central office and on-site preparation allows for variety. The inventories have increased slightly and this is beneficial given quantity purchasing and high cost of transportation. Through the County purchasing collaborative, an estimated $1,000 was saved. By operating the trucking of inventories $500 was saved. The Granby Schools are participating in the Hampshire County Purchasing Collaborative. The Nutrition Education Collaborative and the Department of Education have provided brochures and other materials on nutrition education. Portion controls provide standardization using serving utensils. The administrative office has monitored work flow and procedures are examined for quality control. Production control is aided by pre-determined counts and control records. Nutrition education is conducted with the aid of a state grant. Benefits include increased productivity, increased participation, and a management record system that facilitates cost controls.

Efficiency (assurances/claims or cost savings)

Estimated savings for *county* cafeteria goods will be available in 1981.

Availability

Further information is available from the County Purchasing Collaborative, Hampshire County Courthouse, Northampton, MA 01060.

Contact Person

Gary Costin
Granby Public Schools
West Street School
Granby, MA
(413) 467-9235

MG-789

Title — Food Service Management
Lee Public Schools

Description

Two lunches are offered each day and students in both schools and satellite program make their selections on a daily basis. Menus for lunches in the school cafeteria are posted weekly. Work-study students prepare monthly menus. A daily journal records when inventory is received and used. A "floater" continually restocks items at the serving line, so that students are served quickly. Condiments and salad dressings are available so that students can help themselves. Students are encouraged to share ideas regarding menus and serving methods.

Efficiency (assurances/claims or cost savings)

Less waste is reported as well as daily records for inventory control.

Contact Person

Gertrude Ford
Lee Public Schools
45 Railroad Street
Lee, MA 01238
(413) 243-2100

MG-792

Title — Student Participation In School Food Service Program
Ludlow Public Schools

Description

Because of declining enrollments at the junior and senior high schools, and the possibility of decreasing student participation, two new lunch programs were initiated to increase participation and thereby offer more students nutritionally balanced meals. Three meal choices are offered each day including a hot lunch, sandwich selection, and salad bar. The sandwich program was pilot-tested by senior students in June, 1979 and formally begun in September. Student response to date has been enthusiastic, and increased student participation in the school lunch program is estimated at 25-30%. The salad bar was pilot-tested in June, 1980 and initiated in September. Student satisfaction is evident.

Efficiency (assurances/claims or cost savings)

No additional expense was incurred when this program began. Instead of purchasing specialized equipment, existing tables and racks are used in different ways. This has resulted in an estimated $3,000 savings.

Contact Person

Evelyn M. Dunn
Director of School Food Services
Ludlow Public Schools
500 Chapin Street
Ludlow, Massachusetts 01056
(413) 583-2511

MG-794

Title — Food Service Program
Milford Public Schools

Description

Purchasing power has increased and the bid process has been streamlined to eliminate time consuming elements on the part of each separate food service director. It is estimated that $5,000 is saved annually (with expenditures of $50,000 yearly on paper products and plastic alone). Working together, the members of The Education Cooperative established specifications, and bids are advertised for specific classes of products. Quantity purchasing resulted in favorable prices from bidders. Each town places its own orders and makes its own delivery arrangements after the bid is announced. The greatest savings is in the area of paper and plastic supplies; other savings are obtained in purchase of bread and ice cream. A yearly report is prepared. Cleaning services and purchase of cleaning products and disposables are added features of this cooperative purchasing mechanism. Participating members of The Education Cooperative are Needham, Wayland, Dover, Sherborn, Westwood, Walpole, Weston, Dedham, and Wellesley. Natick and Framingham are members of TEC but do not participate in the purchasing program. Marlboro is not a TEC member but participates in some group purchasing.

Efficiency (assurances/claims or cost savings)

Cooperative purchasing is cost-effective. Savings on paper supplies are estimated at $5,000 yearly.

Availability

Bid specifications are available for review. A yearly report is available from TEC Collaborative.

Contact Person

M. Joyal
Food Service Director
Milford Public Schools
West Fountain Street
Milford, MA 01757
(617) 473-5991

MG-790

Title — Food Service Management
Norwell Public Schools

Description

The purpose of this management project is better cost control and higher food quality for greater student acceptability. Students and parents have increased participation and acceptance for the program. Monthly staff meetings and workshops are available for personnel training. Sales have increased, services and lunch counts cover all staff labor costs. A summary of management procedures has been prepared describing the approach taken and the resulting cost-efficiencies. A salad bar program and vegetable choices were instituted to lower plate waste. Monthly ordering permits better control and pricing; a quote sheet was established with ordering prices firm for 30 days which encourage competitive buying. Dry and freezer storage were initiated at a central location. Central baking and satellite delivery save labor and allow better quality control and portion control. A breakfast program at the high school and diversified menus (multiple choice daily entrees) encourage student participation. Food committees (high school) and presentations to elementary school classrooms on food service bring the food preparation services closer to the students. Menus are based on student surveys and participation.

Efficiency (assurances/claims or cost savings)

Savings were reported in terms of lower labor costs vis a vis productivity. Food waste was reduced; lower food costs result from improved purchasing.

Contact Person

John D. Callahan
Food Services Director
Norwell Public Schools
321 Main Street
Norwell, MA 02061
(617) 659-2277

MG-796

Title — Foods Service
Revere Public Schools

Description

Revere operates a central information, record keeping and purchasing program with satellite preparation. Training was provided with the Youth Advisory Committee, and PTA groups provide feedback on food served and prepared by the public schools. There is central management of all purchasing, financing and management. Individual group leaders oversee food preparation, serving and cleanliness of operations.

Efficiency (assurances/claims or cost savings)

Dollar savings have not been computed as of December, 1980. Savings are mainly in purchasing power.

Contact Person

George A. DeVito
Director of Food Services
Revere Public Schools
10 Pleasant Street
Revere, MA
(617) 289-9200, Ext. 172

MG-786

Title — School Lunch Program
Seekonk Public Schools

Description

A record book detailing daily participation and menus in each school is kept to determine which meals are favorites and most cost-effective. All schools subscribe to a cash system. The schedule of duties for all cooks in the system is rotated so that their jobs do not become monotonous. Several times each year, parents are encouraged to attend meetings concerning the school lunch program. Since 1975, the program director has invited parents of first-grade students to have lunch with their children during National School Lunch Week and is available to answer questions regarding the program. This practice results in increased student participation. Lunch advisory meetings are held at all levels. Elementary school P.T.A. mothers meet with the progam director every month. At the Intermediate School, the director meets with the kitchen's head manager, assistant principal, bookkeeper, and about ten students every other month. At the high school, students, principal, and director meet once a month. Students and parents are encouraged to offer constructive criticism, comments, and ideas. Many Senior Citizens in the community eat lunch at the high school each day at specified times. Their comments regarding the program are also sought.

Contact Person

Ms. Nellie Domina
Lunch Program Director
The Public Schools of Seekonk
School Street
Seekonk, MA 02771
(617) 336-7580

MG-800

Title — Schools Food Service Management
Wellesley Public Schools

Description

This high school food service program focuses on saving dollars through cooperative purchasing and eliminating waste in school cafeterias. With the implementation of a full a-la-carte lunch featuring deli sandwiches, fries, etc., student participation in the lunch program increased by 100%. On the first day of school, posters and announcements welcomed students to the High School Deli. A comparison chart listing school food prices in fast food restaurants was posted. Portion control for these lunches is imperative. Each sandwich is weighed for 3 oz. protein as it is made, and french fries are portioned into 6 oz. Kantleek trays. Markup ranges from 50%-100%. Students are handed their selection over the counter as they are served. Daily menus are posted inside and outside cafeteria so students can decide what they want before actually getting to the counter. Waste on teacher's lunch line has been cut substantially since the $1.25 teacher's lunch was replaced with an assortment of a-la-carte items. An unanticipated benefit of this program is the decrease in school vandalism during lunch-time. More students are staying in school for lunch.

Efficiency (assurances/claims or cost savings)

Cooperative purchasing results in cost-effectiveness.

Availability

Contact TEC Collaborative for information on cooperative purchasing.

Contact Person

Jill Jarvis
Director of Food Service
Wellesley Public Schools
50 Rice Street
Wellesley, MA 02181
(617) 235-7250, Ext. 194

MG-795

Title — Food Service Management
Williamstown Public Schools

Description

This food service program offers students nutritional meals by decreasing the amount of processed food, sugar, salt and fat in daily lunches. Menus provide increased choices of fresh or frozen fruits and vegetables. Additionally, high per meal costs were reduced as the quality of food served in the cafeteria improved. Parents, cafeteria workers, administrators and school committee members were surveyed for participation on the school lunch advisory committee. A nutrition policy was adopted by the school committee and the advisory council periodically reviews menus for nutritional value. Changes in the menus and new procedures for cafeteria management were adopted. Nutrition workshops were conducted for teachers and parents. With no additional expenditures, savings were reported. Some personnel training for equipment usage and baking was provided. Inventories and ordering were carefully monitored. The cost per meal decreased as student participation rate increased by 11%.

Efficiency (assurances/claims or cost savings)

An estimated 20¢ per meal has been saved; this amounts to a cost savings of approximately $11,000 yearly.

Availability

A copy of the nutrition policy adopted by the school district is on file.

Contact Person

Ronald J. Gagnon
Williamstown Public Schools
96 School Street
Williamstown, MA 01267
(413) 458-5707

MG-817

Title — Transportation Collaborative for Special Needs
Project Accept Collaborative

Description

This project offers cost-effective transportation for students with special needs who are tuitioned out of district (approximately 280 students from ten separate school districts). One contract is issued for transporting special needs children to out-of-town schools. School wagons are utilized and the per rider costs are lower than if each district bid separately. Quality service is provided and supervised by the transportation coordinator. After reviewing the cost-benefits, other in-district students were added to the bus transportation contract.

Efficiency (assurances/claims or cost savings)

The transportation project spends $334,000 annually and estimates a 30% to 35% savings below what it would cost an individual district.

Availability

Bids, specifications and contracts are available from the project director.

Contact Person

Michael Paladino
Project Accept Collaborative
11 Howe Street
Framingham, MA 01701
(617) 872-7280

MG-784

Title — Cooperative Transportation Services Project
Assabet Valley Special Needs Collaborative

Description

A transportation feasibility study was conducted in 1977-78 and a coordinator was appointed to work with business managers from the member districts. The coordinator maintains purchasing records and specifications for bidding; she spends ⅓ time on cooperative purchasing and ⅔ time on special needs transportation for the collaborating districts. A Cooperative Services Advisory Committee was formed representing business managers from separate districts for planning bids and specifications. The collaborative writes the bid specifications and accepts bids from transportation companies. Transportation requirements are derived from individual education plans and from communications with the special education directors in the districts. Procedures and forms were developed including vehicle inspection, invoicing formats, parent information cards and the like. The collaborative assumes the responsibility for verification and monitoring of attendance and submits accurate invoices to districts for pupils transported. In-service education is provided for drivers in compliance with Chapter 766 regulations.

Efficiency (assurances/claims or cost savings)

The project demonstrated a reduction in the costs compared to transportation services previously used by the individual districts. The addition of a regional coordinator from the collaborative staff made this plan cost-effective for the district administrative personnel.

Availability

Bid specifications are available from the Project Director.

Contact Person

Lois L. Johnson
Cooperative Services Coordinator
Assabet Valley Special Needs Collaborative
Fitchburg, MA 01752
(617) 481-2424

MG-751

Title — Collaborative Transportation Project
Concord Area Special Education Collaborative

Description

Approximately 14 school districts, with 170 special education students, are served in this cooperative bidding and contracting for transportation out-of-district. The CASE Collaborative provides a coordinating and monitoring service for the districts. The assignment of a coordinator for the region from the CASE staff made this plan's operation cost-effective. Factors were examined to determine if administration could cut costs while reducing travel time and conserving energy. This transportation network was developed in response to Chapter 766 (P.L. 94-142) legislation and guidelines. Each of the towns had previously contracted for transportation services for their special education students on an individual, local basis. Special equipment or treatment required, routes and schedules were all considered in the planning. Methods include use of regular school buses, specially equipped school buses, station wagons and carryalls for students with varying disabilities. Estimated savings using multi-year versus a one-year contract were $30,000. A service quality questionnaire was prepared by the coordinator.

Efficiency (assurances/claims or cost savings)

It is estimated that a substantial reduction in the actual number of miles driven and in the cost per mile can be achieved as compared to transportation services used by individual districts. A net cost savings of $35,000 per year was reported. In addition, students spent less time in the vehicle.

Availability

Bid specifications are available from the CASE Collaborative.

Contact Person

Dale Ann Lyle
Concord Area Special Education Collaborative
40 Stow Street
Concord, MA 01742

MG-752

Title — Cooperative School Busing
Nashoba Regional High School

Description

School bus transportation is coordinated for member towns by the Nashoba Regional High School and bidding and contracting are conducted cooperatively. Three school committees need to cooperate for this type of regional coordination to occur. Minor adjustments were made in the starting and closing times of schools to accommodate the bus schedules. Elementary school systems feed into this larger Regional High School from Bolton, Lancaster and Stow. One contractor was awarded the bid for transportation of students to the elementary schools in Bolton, Stow and to the Regional High School. The elementary school system of Lancaster bid a contract for a period of two years to coincide with the Regional School contract which saved the town of Lancaster additional money. Buses from all three towns transport the High school students first and the same buses are then rerouted to the local towns to transport the elementary students. An option clause was utilized to extend the Lancaster contract to five years at the same price bid for three years with no gas escalation clause. The estimated savings resulted from the projection that gasoline costs and bus costs would rise sharply; this 2-year, no-cost extension was a direct result of the cooperative bidding. The final report contains guidelines and sample clauses for use in developing transportation bid specifications and contracts. Sample bid forms are provided along with a specimen school transportation contract.

Efficiency (assurances/claims or cost savings)

Expenditures of $428,541 resulted in estimated savings of $13,000 per year.

Availability

A final report is available from the superintendent's office. A December, 1979 NESDEC publication described The School Bus Transportation Study.

Contact Person

Roland C. Miller
Superintendent
Nashoba Regional High School
Green Road
Bolton, MA 01740
(617) 779-2257

MG-785

Title — Cooperative Purchasing
Assabet Valley Collaborative

Description

A coordinator for collaborative services allocates ⅓ time to cooperative purchasing and ⅔ time to special needs transportation. The coordinator plans with the Cooperative Services Advisory Committee (business managers) from member districts. Also, the coordinator works with art specialists in determining item lists and descriptions of materials/supplies to be purchased. General supplies list was used as a base (1980-81) from the largest district. Area task groups were established to work on the item list and descriptions for new bidding projects in addition to art and general supplies. Deliveries are made to each school in the individual districts. The coordinator recommends tightening of item descriptions to insure quality control and earlier bidding to avoid delivery delays.

Efficiency (assurances/claims or cost savings)

No estimate of dollar amount has been calculated.

Contact Person

Lois L. Johnson
Cooperative Services Coordinator
Assabet Valley Special Needs Collaborative
Fitchburg Street
Marlboro, MA 01752
(617) 481-2424

MG-820

Title — Cooperative Purchasing for Food Services
Hampshire Educational Collaborative

Description

Food service directors met with the City purchasing agent to discuss feasibility of collective purchasing. Two preliminary meetings were held and specifications for food items were drawn up in categories; e.g., frozen food, staples, meats and fish, canned fruits and vegetables. Some paper products and miscellaneous items were also included. Product quality has improved along with the estimated dollar savings. Participation and merchandizing ideas are also shared among the districts. Districts include Gateway Regional, Hampshire regional, Belchertown-Granby. As a result of County bids, the districts receive the same pricing structure as the Hampshire County Collective. Additional cooperating districts are Amherst, Amherst Pelham, Pelham, Northampton, South Hadley, Easthampton, and Hampshire County Jail. Purchasing of general school supplies was phased in over a three-year time line. The county purchasing agent coordinates purchase of school supplies, cafeteria items and maintenance supplies for 7 of the 11 school districts in Hampshire County. Spin-off benefits include joint use of space, materials and equipment by County and HEC districts, as well as the development of computerized business management services to school districts and municipalities. Plans for region-wide transportation services are now under way.

Efficiency (assurances/claims or cost savings)

Based upon expenditures of $180,000 for food, the estimated savings was 11% or $19,800 (general supplies, maintenance supplies and cafeteria goods).

Availability

School districts volunteer their services for training other districts/collaboratives and for consultation on purchasing. Bid specifications are available for viewing. An estimated savings report will be available in 1981.

Contact Person

Paul Petit
Hampshire County Purchasing Agent
Court House
Northampton, MA 01060
(413) 586-6133

MG-767

Title — Cooperative Purchasing
Merrimack Education Center

Description

The purpose of cooperative purchasing is to secure the lowest prices possible for commodities or services desired by participating school systems through a collective bidding and purchasing process. The Director of Educational Services for MEC conducts this process each school year, with the business managers of approximately nine school systems. Other school specialists, such as special needs administrators, also participate in the process when appropriate. Specifications for out-of-district transportation of special needs students, fuel, and selected school supplies and materials have been developed for use in this collective process. Following a review of bids submitted for each service or commodity received, the business managers collectively agree on bid awards and then individually recommend corresponding action to be taken by their School Committees. Resulting contracts or purchase orders are issued by the individual School Committees. MEC serves as a catalyst and coordinating agent in developing and issuing these collective bids.

Efficiency (assurances/claims or cost savings)

School districts acquire goods and services according to the lowest possible quantity bid.

Availability

Bids, specification and sample contracts are available from MEC.

Contact Person

Maurice Smith
Merrimack Education Center
101 Mill Road
Chelmsford, MA 01824
(617) 256-3985

MG-821

Title — Cooperative Purchasing Manual
Project SPOKE

Description

Cooperative purchasing can be used to acquire materials, supplies, equipment and services at lower prices and reduce personnel costs through efficient management techniques. Prepared by Project SPOKE, this manual is designed to guide the implementation of cooperative purchasing by educational collaboratives. It describes the process of cooperative purchasing and lists its advantages; it also provides a procedural checklist and time line. The bulk of this handbook is six appendixes providing bid announcements, lists of educational specifications, and other forms and instructions related to the purchasing of six types of commodities: art supplies, audiovisual equipment, audiovisual materials and supplies, fuel oil, general school supplies, and transportation of special needs students. Vendors submit proposals to Project SPOKE and they in turn send them to participating schools. Each district issues its own purchase orders and processes payments individually. School districts of Easton, Norton, Foxborough, Mansfield, Attleboro and Norfolk participate in the program to centralize purchases.

Efficiency (assurances/claims or cost savings)

School districts acquire materials, supplies, equipment and services at the lowest possible cost. An average of 38% to 40% on materials and supplies was saved by districts; from .05¢ to .09¢ per gallon was saved on fuel oil. The director reports a reduction of time spent by administrators in each district and resultant savings are diverted to curriculum and instruction.

Availability

Manual is available for purchasing at cost and specifications are available for viewing.

Contact Person

John Stefani
Project SPOKE
37 West Main St.
Norton, MA 02766
(617) 285-7766

MG-291

Energy Conservation Services

Some of the school systems mentioned in this booklet made use of commercial vendors or professional organizations in their plans for conserving energy. The following is a list of those companies or organizations and the services they provide:

American Energy Management Corporation
239 Boylston Street
Boston, MA 02116
262-0534

- *vendor for an in-house microcomputer control system*

Honeywell
70 Wells Avenue
Newton, MA 02159
969-0250

- *BOSS (Building Operation Service System)*

Johnson Controls, Inc.
16 Wheeling Avenue
Woburn, MA 01801
935-6050

- *TABS (Time-shared Automated Building Service)*

MASBO Cooperative Corporation
55 Chapel Street
Newton, MA 02160
964-3570

- *a non-profit educational management organization*

Massachusetts Association of School Superintendents, Inc.
18 Tremont Street, Suite 143
Boston, MA 02108
523-4263

- *has an operational Energy Conservation Committee*

Massachusetts Office of Energy Resources
73 Tremont Street, Room 800
Boston, MA 02108
727-1900

- *prepares a series of energy booklets; operates a grants program for financial assistance, etc.; and conducts conservation seminars and workshops*

Preferred Utilities Manufacturing Corporation
11 South Street
Danbury, CT 06810
(203) 743-6741

- *offers equipment leasing arrangements*

Bibliography

Association of School Business Officials (ASBO). Field-Proven Programs to Conserve Energy In Schools. Park Ridge, Illinois: ASBO, 1980. Compiles proven energy conservation programs from a Special Session at the 66th Annual Meeting, October, 1979.

ERIC Clearinghouse for Science, Math and Environmental Education. Programs: Elementary School Programs and Resources. Columbus, Ohio: ERIC 1979. A bulletin listing resources annotated in *Resources in Education* ERIC ED 183386.

Department of Energy. Total School Management Program. Washington, D.C.: DOE, 1980. A 174-page manual detailing low-cost energy conservation measures focusing on school buildings, school buses, and classroom activities.

Massachusetts Department of Education. Classroom Energy Materials. Spring, 1980. Describes available bibliographies, classroom materials, publications, media, newsletters, and energy related organizations.

University of California. Saving Schoolhouse Energy: Final Report. June, 1979. Provides information that school administrators can use to identify ways of implementing specific, economical remedies to reduce energy waste in schools.

New England Innovation Group, Inc. Conducts audits and technical assistance studies for school districts. Providence, Rhode Island, North Main Street, 02903 (401) 272-3437.

U.S. Department of Energy. Energy Education Workshop Handbook. Washington, D.C. Prepared by National Science Teachers Association for workshop leaders to assist in all grade levels. Includes interdisciplinary approaches to energy conservation and workshop planning aids.